IN THE CLAIMS

Claims 1-5, 7-18, 30 and 31 are canceled without prejudice or disclaimer. Claims 32-53 are added.

The following is a claim listing showing the claim status.

1-5. (canceled)

6. (Original) A porous carbon nanotube containing structure comprising:

a large pore support having through porosity; and

carbon nanotubes disposed over the large pore support.

7-18. (canceled)

19. (Original) A method of adsorbing a chemical component, comprising:

contacting the structure of claim 6 with a chemical component whereby the chemical component is adsorbed on the surface of the structure.

20. (Original) A method of adsorbing a chemical component, comprising:

contacting a carbon nanotube-containing structure with a chemical component whereby the chemical component is adsorbed on the surface of the structure;

wherein the carbon nanotube-containing structure comprises a support, carbon nanotubes disposed over the support, and a mesoporous silica layer disposed between the support and the carbon nanotubes.

21. (Original) The method of claim 20 wherein the chemical

component is hydrogen.

22. (Original) The method of claim 21 wherein the carbon nanotube-containing structure further comprises a layer of palladium exposed on the surface.

23. (Original) A method of separating a component, comprising:

contacting the structure of claim 6 with a mixture whereby the structure of claim 6 separates at least one component from the mixture.

24. (Original) A method of separating a chemical component, comprising:

contacting a carbon nanotube-containing structure with a mixture whereby the structure separates at least one component from the mixture;

wherein the carbon nanotube-containing structure comprises a support, carbon nanotubes disposed over the support, and a mesoporous silica layer disposed between the support and the carbon nanotubes.

25. The method of claim 23 wherein the structure acts as a filter.

26. (Original) The method of claim 24 wherein the structure further comprises an ion exchange medium on the surface of the structure and the separation comprises exchanging an ion with at least one component in the mixture.

27. (Original) The method of claim 24 wherein the mixture is

distilled in the presence of the structure.

28. (Original) The method of claim 20 wherein the support has through porosity.

29. (Original) The method of claim 24 wherein the support has through porosity.

30. (canceled)

31. (canceled)

32. (New) The method of claim 19 wherein the chemical component is desorbed from the surface in a process of pressure swing adsorption or thermal swing adsorption.

33. (New) The method of claim 20 wherein the chemical component is desorbed from the surface in a process of pressure swing adsorption or thermal swing adsorption.

34. (New) The method of claim 23 wherein the concentration of the at least one component changes by at least 50%.

35. (New) The method of claim 23 wherein the support comprises a large pore support having a pore size of at least 1 μm.

36. (New) The method of claim 24 wherein the support comprises a large pore support having a pore size of 500 nm to 400 μm.

37. (New) The method of claim 23 wherein the carbon nanotube-containing structure is a porous material that has a pore volume of 30 to 95% and wherein at least 20% of the material's pore volume is composed of pores in the size range of 0.1 to 300 μm.

38. (New) The method of claim 24 wherein the support comprises a macroporous membrane.

39. (New) The method of claim 38 wherein the mesoporous silica layer substantially fills the pores of the macroporous membrane.

40. (New) The method of claim 39 wherein the carbon nanotubes have been treated with an ion exchange medium and the method comprises ion exchange.

41. (New) The method of claim 19 wherein at least 90% of the carbon is in the nanotube form.

42. (New) The method of claim 24 wherein at least 50% of the carbon is in the nanotube form.

43. (New) The method of claim 23 wherein at least 80% of the carbon is in the nanotube form.

44. (New) The method of claim 20 wherein the nanotubes are sufficiently dense to cover the support.

45. (New) The method of claim 23 further comprising an oxide

layer disposed between the support and the nanotubes.

46. (New) The method of claim 19 further comprising an oxide layer disposed over the carbon nanotubes.

47. (New) The method of claim 24 further comprising an oxide layer disposed over the carbon nanotubes.

48. (New) The method of claim 23 further comprising a layer of an electroactive polymer disposed either between the support and the nanotubes or over the nanotubes.

49. (New) The method of claim 48 comprising a step of separating monovalent ions from Cl^- in water.

50. (New) The method of claim 23 wherein the carbon nanotube-containing structure is a monolith having a volume of at least 5 mm^3.

51. (New) The method of claim 24 wherein the carbon nanotube-containing structure is a monolith having a volume of at least 5 mm^3.

52. (New) The method of claim 23 wherein the separating a component comprises a step of distilling.

53. (New) The method of claim 20 wherein the mesoporous silica layer is at least 1 μm thick.